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ABSTRACT

In response to the increased use of the Internet for information access and dissemination, and the explosion in the availability of resources which may be of interest to end-users, a number of services are now available which provide access to selected and evaluated resources. Many existing Internet search tools are inadequate due to the high rate of recall, low precision, and a lack of filtering. Consequently, the development of evaluative tools is potentially useful for both end-users and information professionals. This paper discusses and compares a number of sites which seek to select, evaluate, review, or describe networked information sources. The paper looks at an overview of the sites' services, resource selection, level of description, subject classification and organization, and review criteria used. The paper is the result of work carried out by the Organizing Medical Networked Information (OMNI) Advisory Group for Evaluation Criteria which has been looking at a range of services available via the Internet for accessing selected and evaluated medical information sources, and the criteria they use. Internet review services differ greatly in terms of coverage, formality, and intended audience--sites tend to be aimed either at a general audience, covering a broad range of subject areas and produced informally, or specifically at academic and research users and involving the use of formal evaluation criteria, implemented by information professionals or subject experts. URLs (uniform resource locators--Internet addresses) of Internet review services are appended. (Contains 13 references.) (Author/SWC)

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The good, the bad and the ugly: Internet review sites

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Abstract: *In response to the increased use of the Internet for information access and dissemination, and the explosion in the availability of resources which may be of interest to end-users, a number of services are now available which provide access to selected and evaluated resources. Many existing Internet search tools are inadequate due to the high rate of recall, low precision and a lack of filtering. Consequently, the development of evaluative tools is potentially useful for both end-users and information professionals.*

This paper will discuss and compare a number of sites which seek to select, evaluate, review or describe networked information sources. The paper is the result of work carried out by the OMNI Advisory Group for Evaluation Criteria which has been looking at a range of services available via the Internet for accessing selected and evaluated medical information sources, and the criteria they use.

Keywords: Internet, review services, information evaluation

1. Introduction

The Internet initially developed as a global communications channel, allowing the world-wide exchange of messages via e-mail. With the success of the World Wide Web and the widespread adoption of browsers such as Mosaic and Netscape Navigator, there has been an unprecedented explosion in the number of users of networked information as well as in the number of information providers:

> 'The Internet is frequently described by its users ... as a "realm of pure mind". Anything which is thinkable can be expressed to an audience of hundreds of thousands' (Ref 1).

Commercial organisations now recognise its potential for global advertising and selling. Individual organisations, including universities and other research institutions world-wide, rely on the Internet as a mechanism for disseminating promotional material, course details, research profiles and so on. A number of existing journals, magazines and other publications produce parallel online equivalents and publishers have developed e-zines and online journals where the definitive version is electronic. The media generally has begun to move into the interactive age with online programme information and contact details. In addition the personal home page, listing such materials as individuals' hobbies and interests, pictures of pets and links to pop stars' pages, is a continuing phenomenon of the networked environment. Indeed, the list of available resources is endless.

However, ease of access and dissemination has resulted in a number of problems for network users and recent critics have begun to consider the problems associated with the availability of so much information. Davey Winder suggests that threats to the Internet not only include censorship, pornography and commercialisation but also information overload: 'there's now so much information available on the Net, and so many people trying to access it, that something, somewhere, has got to burst.' Information overload presents two central problems: firstly, 'finding the information you want in a sea of dross', and secondly 'getting connected and managing to download the information once you've located it' (Ref 2). Likewise, Louis B. Rosenfeld identifies similar problems which relate to finding information — determining the existence and location of resources, using the different software available, as well as problems of 'scale' and 'quality':

> 'Scale: ... the user may win the battle of the Internet, namely, finding a useful information resource, only to lose the battle of traditional information retrieval, namely being overwhelmed by too many hits from a large database.'

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'Quality: The majority of the information found on the Internet is lacking in terms of currency, authority and comprehensiveness; in addition, only a handful of resources is refereed in any way. Unfortunately there are few trusted mechanisms for assessing the quality of the Internet's information resources' (Ref 3).

Matthew Ciolek has expressed his concern about the growth of what he calls 'multi-media mediocrity' in an article in which he posits that the ratio of total volume of networked information (measured in megabytes) to information useful to scholars may be much smaller than imagined. He is also concerned with long-term trends and prospects for the quality and reliability of WWW-based information resources (Ref 4). This concern is expressed in part through the creation of the Information Quality WWW Virtual Library, a set of pages which keeps track of online resources relevant for evaluation, development and administration of high quality factual/scholarly networked information systems (Ref 5).

Much research work has been concerned with the development of (WWW-based) search and retrieval tools with the aim of providing effective subject access to resources. Examples include automatically generated indexes such as Lycos and Alta Vista, and manually created 'virtual libraries' or catalogues, such as Yahoo!. Existing search and retrieval tools may assist in the identification of information sources but as the number of resources available via the Internet continues to grow, so the number of resources retrieved becomes increasingly unmanageable. Often a search results in the user being faced with an unwieldy quantity of pointers or links, with no clear way of restricting search results. The user must expend time and energy sifting through results, only to find that material may be out-dated, no longer available, or that a number of individual pointers link to different parts of the same source. Although some search engines offer sophisticated relevance ranking mechanisms and these may improve recall, the first items returned by the search tools are not necessarily the most relevant to the user, and casual users without a background in information retrieval are often not prepared to invest time in learning to use the ranking mechanisms effectively. Furthermore, such practices as word spamming may serve to undermine the possible benefits of relevance ranking.

Prior to the availability of networked information, users could have some confidence in the quality of information available to them. For example, publishers of popular material have a commercial imperative to produce 'quality' material while academic publishers seek to maintain quality through the editing and refereeing processes. However, the Internet enables anyone to become an author and provider of information — authors need not adhere to concerns for an audience but may publish at will. Material may be purely egocentric or of an ephemeral nature and of little interest to others. In particular there is considerably more vanity publishing in the networked environment (for example the personal home page), which has been noted by Hope Tillman (Ref 6). Thus individual users are now faced with the need to identify not only relevant material but also quality material.

In response to such problems, a number of sources and services have been developed which attempt to select, evaluate and review networked information. Journals such as *Online*, *Database* and the *Library Journal* regularly print reviews of Internet resources and *College and Research Libraries News* features an Internet reviews section in each issue. *Ariadne* (Ref 7), a two-year parallel publishing journal project funded under the UK's Electronic Libraries Programme, also includes regular reviews. Such sources may assist end-users but are primarily aimed at the information professional audience.

On the Internet itself a number of reviewing services have been developed. Such services seek to select, evaluate or review networked sources in order both to identify relevant materials and also assess the quality of the material retrieved. The development of such evaluative tools is potentially useful for both end-users and information professionals alike. However, such services are themselves of varying usefulness and quality. This paper seeks to compare a number of such sites, offering a guide to the types and variety of services which are now available.

2. Internet review sites

A number of review services were selected for comparison: A#1 Quality Directory, Cyberstacks, Excite, Healthweb, InfoFilter, Magellan (McKinley), Medical Matrix, OCLC NetFirst, Organising Medical Networked Information, Point Web Reviews, Science and Engineering Network News, Six Senses and WebCrawler Select (see Appendix for URLs). Originally these services were considered with specific, qualitative questions in mind:

- does the site clearly state the *criteria* it uses for the selection and inclusion of resources?
- is the evaluation site selective in the *type of resource* included?
- is the evaluation site selective in the *subject area* it covers?
- if resources are given a rating (e.g. stars or points), are the *criteria for the ratings* stated?
- do resource descriptions/evaluations include the *name of the evaluator*?
- is there any indication of the *expertise/profession of the evaluator*?
- do resource descriptions/evaluations include the *date* on which the evaluation was written?
- is there a mechanism for the *regular updating* of reviews?
- are the *URLs* for resources included in the database *regularly checked for changes*, either automatically by link-checking software or by a human?

- are *'dead' links* identified and removed promptly?
- does the site include a *search facility*?

However, not all sites explicitly provide details about such aspects of their service. Where information is provided it can often be found under the services' FAQ or the 'about' link. For example, both Magellan and Excite include extensive FAQs about their service, staff and criteria for including resources.

In the event, it was possible to draw together a number of common traits into four broad strands: resource selection; the level of description; subject classification and organisation; and the evaluation criteria used.

2.1. Overview of the services

The services selected for comparison vary greatly in terms of the types of resources covered, the subject coverage and the processes of resource selection, description, organisation and evaluation.

Generally the sites may be divided into three groups, noted in Table 1 overleaf.

The first group includes A#1, Excite, Magellan, Point and WebCrawler Select. These are all fairly informal services which have no particular subject focus. No intended audience is explicitly stated or apparent and the guidelines on resource selection and evaluation criteria (where available) tend to be vague and informal. Such services are not produced by those professionally involved in providing access to information, but rather network enthusiasts and 'cyberwriters'. Point, for example, is produced by 'a mix of long time Web fanatics, some professional enthusiasts and even a few students.'

The second group, comprising CyberStacks, InfoFilter, OCLC NetFirst and SENN, is also broad in terms of subject coverage but tends to be more formal. Either information professionals or subject experts are involved in resource selection, description and evaluation; the services are aimed towards the academic or 'serious' information user; and more detailed selection and evaluation guidelines are available.

The last group of four services are those with a subject focus concentrating specifically on health sciences, medical and biomedical sources: HealthWeb, Medical Matrix, Organising Medical Networked Information (OMNI) and Six Senses. With the exception of Six Senses these services take a more formal approach, involving information professionals and subject experts in the provision of services for academic and research users. Formal criteria and guidelines on selection and description are available. Although Six Senses is concerned with a similar subject area it follows a hybrid approach. Even though the review panel includes a registered nurse and a practising clinician, the emphasis of the evaluation criteria tends to coincide more with the services listed in the first group and the rating scheme produces results that can sometimes be difficult to comprehend.

An indicative summary of a range of features offered by the services can be seen in Table 1.

2.2. Resource selection

The review services examined vary in the approach and thoroughness with which new sources are identified and selected. The informal sites, such as Point, are vague in describing the process of resource selection. Point claims that excellence is the only criterion for inclusion and that it 'makes no distinction between commercial, private, or student pages.'

Alternatively, sites such as HealthWeb and OMNI are more specific. These sites primarily involve health sciences librarians and information professionals in the selection and evaluation of sites. Both state that their interest is in providing access to critically-evaluated resources rather than an exhaustive index of health-related information. Medical Matrix seeks to be comprehensive in its coverage of 'global resources that can assist in patient care', but shares a similar concern for quality resources.

The majority of services invite users to recommend sites, although some indicate that these will only be treated as suggestions. For example, Magellan does not guarantee that a suggested resource will be reviewed, only that it will be added to its searchable database. Submissions are subject to an editorial review process and sites are only accepted on the basis of editorial discretion. GNN Select typically adds no more than 1% of recommended sites. None of the sites automatically include reviews submitted by casual browsers.

Table 1: Features of the review services.

	No of sites included	Resource description or evalustion	Rating/points	Subject organisation	Date of review included	Named reviewer
Group 1						
A#1 Quality Directory	unknown	yes	no	yes	no	no
Excite NetReviews	60,000+	yes	no	yes	no	no
Magellan	45,000	yes	yes	yes	no	no
Point Web Reviews	unknown	yes	yes	yes	no	no
WebCrawler Select	2500	yes	no	yes	no	no
Group 2						
Cyberstacks	unknown	yes	no	yes	no	yes
InfoFilter	50	yes	no	no	yes	yes
OCLC NetFirst	50,000	yes	no	yes	no	no
Sci/Eng Network News	unknown	yes	no	no	no	no
Group 3						
HealthWeb	1223	yes	no	yes	no	no
Medical Matrix	2410	yes	no	yes	no	no
OMNI	800+	yes	no	yes	no	no
Six Senses	100+	yes	yes	yes	yes	yes

2.3. Level of description

The level of description offered also varies according to the nature of the service. For example, InfoFilter provides extensive reviews of resources. The reviews are analytical and provide clear guidance on whether a resource is likely to be of interest to a target audience. Other services offer reviews which are brief and merely indicative of the site described while some are simply annotations or descriptions, with little evaluative detail. Only CyberStacks, InfoFilter and Six Senses include the name of the reviewer.

A number of sites employ a numerical rating system. For example, Point rates resources between 0 and 50 for content, presentation and experience while Magellan rates sites by awarding up to 10 points for depth, ease of exploration and 'Net appeal'.

Disappointingly only two services (InfoFilter and Six Senses) explicitly include the date of the review, although an approximate date can be determined in some cases (for example, if the site review is included in a 'what's new' section). Point can be searched in order of review date but this information is not included in the site annotation. In addition to including the review date, the rapidly-changing nature of the Internet requires regular checking of sites to verify links and to ensure reviews are up-to-date. Six Senses claims to re-evaluate sites every two to three months. However, on closer examination some reviews had been written over six months previously and did not appear to have been updated. Medical Matrix states 'entries are continuously updated and verified'.

2.4. Subject classification and organisation

Many services are browsable by subject category. NetFirst offers both Library of Congress Subject Headings and Dewey Decimal Classification numbers. The CyberStacks project has begun to list Internet review services and subject collections by their own classification scheme (Ref 8). Perhaps surprisingly for a review service produced by librarians, InfoFilter has chosen not to include classification codes. NetFirst offers both Library of Congress Subject Headings and Dewey Decimal Classification numbers. Of particular interest to medicine are sites which organise resources by the National Library of Medicine classification codes (NLM) and Medical Subject Headings (MeSH), and here OMNI is a good example.

While most general review sites (such as Excite, Magellan and Point) tend to include a section of 'health/medicine' resources, they do not offer such formalised organisation as the services specialising in biomedical resources.

The majority of review sites are also searchable by keyword. Where a controlled vocabulary is included, such as the use of MeSH, consistency is improved. However, the use of thesauri is not widespread.

2.5. Review criteria used

The nature of the criteria used to evaluate and review information sources is dependent upon the providers of the service. Librarians and other information professionals have long been involved in the critical selection and evaluation of information sources. Evaluation criteria have been developed over the years for the evaluation of reference works, monographs, audiovisual materials and more recently online and CD-ROM sources. Consequently, those services provided by information professionals tend to use fairly formal criteria. For example, CyberStacks bases its evaluations on criteria taken from the American Library Association manual for Reference Collection Development. Resources are evaluated under the broad areas of authority, accuracy, clarity, uniqueness, recency/timeliness, community needs and whether any other favourable reviews are available.

As part of the InfoFilter project, participants are actually concerned with criteria development and a similar set of criteria has been drawn up. Boyd R. Collins, founder of the InfoFilter project states:

> 'The current reviewing mechanisms we have for print materials arose from the need for objective standards in the face of the mass of materials that are produced yearly. The idea behind the InfoFilter project is to leverage the same well-developed and tested principles of reference book reviewing to the sources available on the Web' (Ref 9).

Likewise, the subject-oriented services use criteria based on those traditionally used by information professionals for evaluating other sources of information.

The 'popular' sites, such as the A#1 Quality Directory, Point and Magellan tend to be concerned with access and presentation issues. Content issues are a consideration (Point considers, 'Just how broad, deep, and amazingly thorough is the information? Are there good links? Good clips? Is it accurate? Complete? Up-to-date?'). However, criteria used in the A#1 Directory include the time taken for a page to load (the service aims to provide links to resources which load quickly using an 'average' computer), pricing, page design and layout and ease of navigation. Likewise, Point asks:

> 'Is the page beautiful? Colourful? Easy to use? Does it lead visitors through the information nicely? Does it use video, audio and original graphics? Does it break new ground? Is it fun? Is it worth the time? Will we recommend it to friends? All things considered, does this site deliver the goods?'

Magellan:

'Is it well-organised and easy to navigate? Is it innovative? Does it appeal to the eye or the ear? Is it funny? Is it hot, hip, or cool? Is it thought-provoking? Does it offer new technology or a new way of using technology?'

3. User-centred review services: the key to successful evaluation?

The analysis of key attributes of a range of review services highlights a number of issues that bear on the actual utility of such sites. A clear basis for resource selection, usually on behalf of a stated target audience, often underlies the development of services that have applied formalised standards of resource evaluation, description and organisation.

For example, for the casual user the existence of classification codes or subject headings may be of peripheral interest only; but for the searcher who is familiar with the vocabulary structure of their own subject area (e.g. medicine), the availability of a consistent means of accessing this is welcome, such as through the use of a controlled vocabulary.

However it is possibly in the criteria for evaluation that the distinctions among services are most clearly visible.

In most subject-based review services, simple inclusion of resources usually acts as an indicator of quality. In contrast, in the absence of a clear target audience, a number of general review sites (such as Point and Magellan) assign ratings and scores, alluding to objectivity. Yet, more often than not, no special weighting is employed and the figures are simply allocated or uniformly aggregated to provide a magical final score or star rating. This leads to an interesting distinction compared to the subject-oriented evaluative initiatives. Medical Matrix, for example, gives explicit weighting to the evaluation criteria used, which are far greater for issues of scope and content than for presentation and innovation. While the display of ratings and scores and the use of presentation and access criteria may offer the end-user some indication of the nature of a resource, it is questionable how useful such an evaluation can be.

Norman Stevens, writing in 1986, lists 18 criteria that could be considered when evaluating reference books. Yet he also notes:

'Not all of these elements carry equal weight in respect to a single work, and, in some cases, a number of them may not apply at all. Judgement in determining what elements do apply and what weight is to then be given to them is especially critical ... A number of standards used to evaluate a reference book may be of little significance to a user' (Ref 11).

Richard Hopkins further elaborates:

'Any system should be based on the actual information needs of the users involved, not just on available technology or on the subject of the area of study under consideration (expressed in a different way the system must be "user-driven" rather than "technology-driven" or "content-driven") ... Users bring identifiable criteria or priorities to information systems; that is they have certain expectations that they want the information system to fulfil' (Ref 12).

Ease of use, noise reduction, quality, adaptability, time saving and cost saving are examples of these.

In a recent review of issues relating to database information quality, Chris Armstrong reported on surveys of information professionals which were conducted independently by EUSIDIC (the European Association of Information Services) and CIQM (the Centre for Information Quality Management). Both these organisations which invited respondents to rank their views of ten evaluation criteria. The top five rankings were (Ref 12):

EUSIDIC	**CIQM**
Coverage	Accuracy
Accessibility	Consistency
Timeliness	Timeliness
Consistency	Accessibility
Accuracy	Coverage

The criteria used in the surveys were originally developed during the Southern California Online User Group (SCOUG) 1990 Annual Retreat and are now widely used in the evaluation of online and CD-ROM information sources (Ref 13). The consistently higher ranking of the five criteria above (compared to the remaining five: value, documentation, harmonisation, output and support) might indicate their suitability for weighting any evaluation. While the SCOUG criteria were originally developed and subsequently ranked by information professionals, it is interesting to note how broadly similar they are to end-users' perceptions.

Alison Cooke is currently conducting research into how end-users of the Internet select and evaluate networked information sources. Preliminary results indicate that users are principally concerned with aspects such as the authority, accuracy and currency of information. Information presentation affects some users but the

overriding factor is information content. The limited attention that most commercial services pay to content evaluation would not realistically offer the user much guidance on such aspects as the authority, factual accuracy, reliability or currency of the source, all of which are central issues to consider when evaluating the quality of information.

4. Conclusion

The development of services which seek to select, evaluate or review networked information sources has been a growth area during 1995 and 1996, and a number of sites are now available. Such services differ greatly in terms of coverage, formality and intended audience — sites tend to be aimed either at a general audience, covering a broad range of subject areas and produced informally, or specifically at academic and research users and involving the use of formal evaluation criteria, implemented by information professionals or subject experts. Some services have elected to take a specific subject focus.

The quality of the reviews provided is affected by factors such as the providers of the service and the size of the site/number of resources evaluated. Small sites provided by library and information professionals, such as OMNI, offer detailed evaluations of resources but are more restricted in the number of sites they can cover. Alternatively, the more general and 'popular' services have a broader coverage and are much larger and of interest to the non-specialist, but provide less evaluative detail. In addition the criteria used by such general sites are far removed from the criteria with which information professionals would evaluate other resources.

At present choosing from amongst the evaluation sites seems to be a variant of the precision vs. recall dilemma: such services can either produce a limited number of quality reviews or a large number of reviews resulting from much less rigorous criteria. As discussed previously, the broader, informal sites tend to focus on aspects such as the layout and presentation of sources in order to assess the 'quality' of different information sources, and pay little attention to content. However, such criteria may not only provide limited detail on the quality of sources but may also be of little value to potential users. Thus it is possible to differentiate between the sites in terms of how meaningful the evaluations really are.

The authors of this paper concur with Richard L. Hopkins (cited earlier) that '... the major problems in future information systems will revolve around the processes of reducing the amount and raising the quality of information brought to the attention of the user.' Evaluative sites with little subject focus, or which do not make formal guidelines available, may cover more resources but ultimately users are likely to be concerned with aspects such as information accuracy and reliability, and thus require a detailed and meaningful review of the quality of different sources.

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Appendix: URLs of Internet review services

A#1 Quality Directory	http://www.illuminatus.com/clients/a1source/
Cyberstacks	http://www.public.iastate.edu/~CYBERSTACKS/
Excite	http://www.excite.com/Subject/
Healthweb	http://hsinfo.ghsl.nwu.edu/healthweb/
InfoFilter	http://www.usc.edu/users/help/flick/Infofilter/
Magellan (McKinley)	http://www.mckinley.com/
Medical Matrix	http://www.slackinc.com/matrix/
OCLC NetFirst	http://www.oclc.org/oclc/netfirst/9352nf/netflyer.htm
OMNI	http://www.omni.ac.uk/
Point	http://www.pointcom.com/
Science & Engineering Network News	http://www.senn.com/
Six Senses	http://www.sixsenses.com/
WebCrawler Select	http://webcrawler.com/select/